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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,997	05/03/2006	Yasuhiro Numao	040356-0586	4939
22428 7590 09/29/2009 FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			EXAMINER ECHELMEYER, ALIX ELIZABETH	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 09/29/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/577,997

Applicant(s)

NUMAO ET AL.

Examiner

Alix Elizabeth Echelmeyer

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date 5/3/06
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The Information Disclosure Statement filed May 3, 2006 has been considered by the examiner.

Claim Objections

2. Claim 16 objected to because of the following informalities: it is written as being dependent from itself. Appropriate correction is required.

For the purposes of examination, it will be interpreted as being dependent from claim 13.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 13, 18, 19, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komura et al. (US 6,242,119) in view of Beshty et al. (US 4,670,359) and Anderson (US 5,408,835).

Komura et al. teach a fuel cell system including a fuel gas supply (16), an oxidizing gas supply (54), a fuel cell (14), and a water recovery device (56, 58) (Figure 1).

As for claim 18, Komura et al. teach a liquid mixture tank (20), a liquid mixture supply mechanism (34), and a fuel reforming device (12).

Regarding claim 19, recovered water (18) is provided to the liquid mixture tank (20).

Komura et al. fail to teach that a water-compatible liquid is used in the water recovery device.

Beshty et al. teach a fuel cell system having a water recovery device which recovers water contained in an exhaust gas by streaming a water-compatible liquid, a mixture of methanol and water, in the water recovery location (22) (Figure 2; column 6 lines 20-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a water-compatible liquid in the water recovery device of Komura et al. such as taught by Beshty et al. in order to help cool the exhaust, aiding in the condensation and separation of water.

Komura et al. in view of Beshty et al. fail to teach that the water-compatible liquid is sprayed.

Anderson teaches an apparatus including a sprayer for spraying a water-compatible liquid, or anti-freeze, into a condensation system for condensing water with the water-compatible liquid (abstract). Anderson further teaches that the anti-freeze is methyl alcohol (column 2 lines 29-31).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to spray the water-compatible liquid of Komura et al. in view of Beshty et al. such as taught by Anderson in order to ensure that sufficient water-compatible liquid was provided.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komura et al. in view of Beshty et al. and Anderson as applied to claim 13 above, and further in view of Keefer et al. (US 2002/0098394).

The teachings of Komura et al., Beshty et al., and Anderson as discussed above are incorporated herein.

Komura et al. in view of Beshty et al. and Anderson et al. fail to teach the use of the water-compatible liquid in a cooling device for the fuel cell.

Keefer et al. teach a fuel cell system having a coolant circuit (468) which uses a mixture of methanol fuel and water (465) to cool the fuel cell (Figure 9; [0125]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the water methanol mixture of Komura et al. in view of Beshty et al. and Anderson to cool the fuel cell such as taught by Keefer et al., since the

skilled artisan would recognize the advantages of cooling the fuel cell, such as prevention of damage to the components due to overheating.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komura et al. in view of Beshty et al., Anderson and Keefer et al. as applied to claim 14 above, and further in view of Suzuki et al. (US 6,653,012).

The teachings of Komura et al., Beshty et al., Anderson, and Keefer et al. as discussed above are incorporated herein.

Komura et al. in view of Beshty et al., Anderson, and Keefer et al. fail to teach a humidifier for on of the fuel and oxidizing gas using the cooling water-antifreeze mixture.

Suzuki et al. teach humidification of the oxidant with off-gas, which inherently contains water and methanol, the water-anti-freeze mixture (Figure 11A).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to humidify the oxidant of Komura et al. in view of Beshty et al., Anderson, and Keefer et al. such as taught by Suzuki et al. since it is within the ordinary level of skill in the art to humidify the oxidant in order to prevent dry-out of the fuel cell membrane.

7. Claims 16, 17, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komura et al. in view of Beshty et al. and Anderson as applied to claim 13 above, and further in view of Shimanuki et al. (US 6,740,432).

The teachings of Komura et al., Beshty et al. and Anderson as discussed above are incorporated herein.

Komura et al. in view of Beshty et al. and Anderson fail to teach a controller for controlling the operation of the water-methanol system.

Shimanuki et al. teach sensors (72, 92, 24) in various components of the fuel cell system for use with the controller (100) (Figure 1).

With further regard to claim 17, it would have been obvious to provide a second mixing tank in the system of Komura et al. in view of Beshty et al. and Anderson in order to provide more storage for recovered water. It has been held that mere duplication of the working parts of a device involves only routine skill in the art. MPEP 2144.04 (VI B).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use sensors and a controller to control the operation of the fuel cell of Komura et al. in view of Beshty et al. and Anderson such as taught by Shimanuki et al. since such a modification would enhance the efficiency of the system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1795

aee